



Clinical Profile of Peripheral Arterial Disease in CKD Patients

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Introduction

Chronic kidney disease (CKD) is global public health problem with significant cause for mortality. Peripheral arterial disease (PAD), the most common manifestation of atherosclerosis, is a atherosclerotic occlusive disease of the lower extremities. It has been a major cause for lower-extremity amputation, especially in those with diabetes.

It is increasingly recognized that chronic kidney disease (CKD) is an independent risk factor for the development of generalized atherosclerosis (including PAD) and coronary artery disease, The ABI, a ratio of the ankle and arm pressures has hardly been used in clinical and epidemiological studies to screen for PAD.

Aim

We studied the clinical profile of peripheral arterial disease (PAD) in chronic kidney disease patients (CKD) of different etiology using ankle brachial index (ABI) as a tool.

Materials and Methods

This study was conducted between November 2016 and May 2019 in Adichunchanagiri Institute

of Medical Sciences, a tertiary care set up in southern India.

Study Design

This was a prospective cross sectional study. The study was carried out in 60 subjects.

Inclusion Criteria

- All subjects admitted to medicine wards diagnosed with CKD in 18 to 80 age groups
- Subjects who gave informed consent.

Exclusion Criteria

- Bilateral filariasis in lower limb
- Cellulitis in lower limb
- Malignancy in lower limb
- Amputated lower limb
- Without consent.

Subjects were screened for various risk factors including Diabets, Hypertension, Smoking, Alcohol.

Subjects's creatinine was measured and stage of CKD was determined accordingly.

ABI was attained by both manual and doppler methods

Upon completion, the data was subjected to statistical analysis and conclusion was drawn.

Methods

Selection of the subjects were from the subjects admitted to medicine wards as a case of chronic kidney disease. Informed consent was taken and actual examination conducted.

Anthropometric measurements were carried out first and then ankle brachial index was calculated manually and by Doppler method.

Measurement of the ABI (Manual)

The Patient

The patient was kept at rest 5 to 10 min, in a room with comfortable temperature.

The patient was not to smoke at least 2 hours before the ABI measurement. We have taken the systolic blood pressure by applying the blood pressure cuff on the posterior tibial artery, the lower edge of the cuff kept about 2 cm above the superior aspect of the medial malleolus and we measured systolic BP by sphygmomanometer in the two lower limbs, then the same method was used for the measurement of brachial systolic BP with the same instrument in the two limbs. In case of discrepancy between the two blood pressure values between the two limbs, the highest of the systolic pressures was taken both in the upper limb and lower limb.

$$\text{Ankle-brachial index (ABI)} = \frac{\text{Ankle Systolic Blood Pressure}}{\text{Arm Systolic Blood Pressure}}$$

Measurement of ABI (Doppler)

The arm was supported at heart level. 8- to 10-MHz Doppler probe was used.

Interpretation of the ABI

The Peripheral Vascular Laboratory uses the following parameters in classifying the severity of PAD by ABI(AHA guidelines 2005)

- 1) >1.30 – non compressible(indicates significant medial wall calcification)
- 2) 1.0-1.29- normal
- 3) 0.90 -0.99 – equivocal or borderline PAD
- 4) 0.70-0.89 – mild PAD.
- 5) 0.40-0.69- moderate PAD
- 6) <0.39- severe PAD.

Results

- Out of the total 60 cases completing the study, 6 patients were in CKD stage 3(10%), 14 patients were in stage 4(23.3%), 40 patients were in stage 5(66.7%) of CKD. Maximum number of patients were in the age group of > 60 years (35%) and least were in age group of < 40 years of age (16.6%). In all the other age groups, there was mild difference in the distribution.
- The distribution for PAD amongst different stages of CKD was maximum in CKD stage 5 accounting for 55% and 45% by means of manual and doppler respectively followed by stage 4 of CKD with 8.3% and 15% followed by stage 3 with 6.7% and 3.3% by manual and doppler method respectively.
- Though CKD is more common in females as seen in previous studies, we observed a distinct male preponderance in all age groups (M:F – 2.3:1), but without any gender-difference in the severity of the disease.
- The prevalence of PAD was also more in male gender in our study accounting for 71%.
- Patients on longer duration of hemodialysis (6 months) had lower values of mean ABI by both methods of ABI indicating greater prevalence of PAD in these patients.
- The prevalence of peripheral arterial disease in different stages of CKD was also studied and was found that the prevalence increased as the disease (CKD) progressed, with less number of patients in stages 3 having ABI values <0.9 and more number of patients in stages 4 and 5 having ABI values <0.9 by both methods of assessing ABI.
- We observed that patients on hemodialysis had higher number of patients with PAD (i.e ABI <0.9) compared to those on conservative management.
- The mean ABI value was lower in those patients on longer duration of hemodialysis (>6months).
- Though some discrepancy was present in between the two methods of obtaining ABI

there was no statistically significant difference between them (p value=0.003) indicating both methods are equally efficient in obtaining the diagnosis of PAD by ABI.

Limitations

OPD patients were not included where the cases of earlier stages of CKD usually could have been picked up.

The sample size was small

Confounding factors like diabetes mellites (DM) altered the lipid profile.

Recommendations

We recommend that larger studies in larger sample size should be done in CKD patients with focus on early stages of CKD with reference to renal replacement therapy (dialysis /transplantation) including both in-hospital and outpatients for better idea of burden of Peripheral Arterial Disease and effect of therapy on Peripheral Arterial Disease.